CLAIMS

We claim:

1. A method for evaluating acute transplant rejection in a host, comprising:

a) obtaining from the host a post-transplantation sample;

b) determining a magnitude of gene expression in the sample of at least one gene of a cytoprotective gene cluster;

c) comparing the magnitude to a baseline magnitude of gene expression of said at least one gene; and

d) detecting thereby upregulation of the at least one gene, wherein upregulation of the at least one gene indicates acute transplant rejection.

2. The method of claim 1, wherein the sample is a graft biopsy.

3. The method of claim 1, wherein the sample is a fluid test sample.

4. The method of claim 3, wherein the fluid test sample is selected from the group consisting of: urine, peripheral blood, bile, bronchoalveolar lavage fluid, pericardial fluid, gastrointestinal juice, feces, and fluid gathered from an anatomic area in proximity to an allograft.

5. The method of claim 1, wherein the upregulation of the at least one gene of the cytoprotective gene cluster indicates early acute transplant rejection.

6. A method for evaluating transplant rejection in a host, comprising:

a) obtaining from the host a post-transplantation sample;

b) determining a magnitude of gene expression of a cytoprotective gene found in the post-transplantation sample;

c) comparing the magnitude to a baseline magnitude of gene expression of said cytoprotective gene; and

d) detecting thereby upregulation of the cytoprotective gene, wherein upregulation of the cytoprotective gene indicates transplant rejection.

7. The method of claim 6, wherein the cytoprotective gene is selected from the group consisting of heme oxygenase-1 and A20.

8. The method of claim 6, wherein the transplant rejection is an acute rejection.

9. The method of claim 8, wherein the acute rejection is an early acute rejection.

10. A method of diagnosing chronic transplant rejection in a host, comprising:

a) obtaining from the host a post-transplantation sample;

b) determining a magnitude of gene expression of a member of the A20 chronic rejection gene cluster found in the post-transplantation sample;

c) determining a magnitude of gene expression of heme oxygenase 1 in said post-transplantation sample; and

c) comparing the magnitude of expression of each gene to a baseline magnitude of expression of that gene,

wherein upregulation of said member of the A20 chronic rejection gene cluster and a low expression level of heme oxygenase 1 indicates chronic transplant rejection.

11. The method of claim 10, wherein said member of the A20 chronic rejection gene cluster is A20.

12. A kit for evaluating transplant rejection comprising a probe set for determining the magnitude of expression of a gene selected from the group consisting of heme oxygenase 1 and A20.

13. A kit for evaluating transplant rejection comprising a nucleic acid that hybridizes to heme oxygenase 1 and a nucleic acid that hybridizes to A20.

14. A kit of claim 13, further comprising a nucleic acid that hybridizes to a constitutively expressed gene.

15. A kit of claim 14 wherein said nucleic acid is selected from the group consisting of SEQ ID NOS: 33, 34, 35, 39, 40 and 41.

16. A probe set comprising probes for the detection of A20 and heme oxygenase-1, said probe set comprising probes for the detection of no more than 4000 genes.

17. A method for evaluating acute transplant rejection in a recipient of a urinary system graft, comprising:

a) obtaining from the host a urine sample;

b) determining a magnitude of gene expression in the urine sample of at least two genes of the pro-apoptotic gene cluster;

c) comparing the magnitude to a baseline magnitude of gene expression of said at least two genes; and

d) detecting thereby upregulation of the at least two genes, wherein upregulation of the at least two genes indicates acute transplant rejection.

18. The method of claim 17, wherein the at least two genes of a pro-apoptotic gene cluster are selected from the group consisting of: perforin, granzyme B and Fas ligand.

19. The method of claim 17, wherein the urinary system graft is a renal graft.

20. A method of determining the cause of delayed graft function in a host, comprising:

a) obtaining a sample from a host diagnosed with delayed graft function ;

b) determining a magnitude of gene expression of at least one gene of the pro-apoptotic gene cluster in said sample;

c) comparing the magnitude to a baseline magnitude of gene expression of said at least two genes; and

d) detecting thereby upregulation of the at least one gene, wherein upregulation of the at least one gene indicates that the delayed graft function is due to immunological causes.

21. The method of claim 20, wherein said graft is a renal graft.

22. The method of claim 21, wherein said sample is a urine sample.

23. A kit for evaluating transplant rejection comprising: a urine sample presentation system and a nucleic acid that hybridizes to a gene selected from a pro-apoptotic gene cluster.

24. A kit of claim 23, wherein said gene is selected from the group consisting of: FasL, granzyme B and perforin.

25. A kit for evaluating transplant rejection comprising: a urine sample preparation system, and nucleic acids that hybridize to at least two genes selected from a pro-apoptotic gene cluster.

26. A kit of claim 25, wherein said at least two genes are selected from the group consisting of: FasL, granzyme B and perforin.

27. A method for evaluating acute transplant rejection in a recipient of a urinary system graft, comprising:

a) obtaining from the host a urine sample;

b) determining in the urine sample the protein level of at least two proteins encoded by genes selected from the pro-apoptotic gene cluster;

c) comparing the protein levels to baseline protein levels of said at least two proteins; and

d) detecting thereby increased levels of the at least two proteins, wherein increased levels of the at least two proteins indicates acute transplant rejection.

28. The method of claim 27, wherein said genes are selected from the group consisting of: perforin, granzyme B and Fas ligand.

29. The method of claim 27, wherein the urinary system graft is a renal graft.

30. A method for evaluating acute transplant rejection in a host, comprising:

a) obtaining from the host a post-transplantation sample;

b) determining in the sample the protein level of at least one protein encoded by a gene of a cytoprotective gene cluster;

c) comparing the protein level to a baseline protein level of said at least one protein; and

d) detecting thereby an increased level of the at least one protein, wherein an increased level of the at least one protein indicates acute transplant rejection.

31. The method of claim 30, wherein the sample is a graft biopsy.

32. The method of claim 30, wherein the sample is a fluid test sample.

33. The method of claim 32, wherein the fluid test sample is selected from the group consisting of: urine, peripheral blood, bile, bronchoalveolar lavage fluid, pericardial fluid, gastrointestinal juice, feces, and fluid gathered from an anatomic area in proximity to an allograft.

34. The method of claim 30, wherein the increased level of the at least one protein indicates early acute transplant rejection.